Annex XXXIV

DRAFT CHAPTER 7.X.

ANIMAL WELFARE AND DAIRY CATTLE PRODUCTION SYSTEMS

Article 7.X.1.

Definition

Dairy cattle production systems are defined as all commercial cattle production systems where the purpose of the operation includes some or all of the breeding, rearing and management of cattle intended for production of milk.

Article 7.X.2.

Scope

This chapter addresses the welfare aspects of dairy cattle production systems.

Article 7.X.3.

Commercial dairy cattle production systems

Commercial dairy cattle production systems include:

1. Housed ~~or confined~~

   These are systems where cattle are kept housed ~~in confinement~~ and are fully dependent on humans to provide for basic animal needs such as food, shelter and water ~~on a daily basis~~. The type of the housing will depends on the environment, climatic conditions and management system. The animals may be loose housed or tethered, within this housing system.

2. Pastured

   These are systems where cattle ~~have the freedom to roam~~ live outdoors, and ~~where the cattle~~ have some autonomy over diet selection ~~(through grazing)~~, water consumption and access to shelter. Pastured systems exclude any housing except that required for milking.

3. Combination systems

   These are systems where cattle are managed in ~~exposed to~~ any combination of housed ~~housing, confinement or~~ and pasture ~~husbandry methods~~ production systems, either simultaneously, or varied according to changes in climatic conditions or physiological state of the cattle.

Article 7.X.4.

Criteria (or measurables) for the welfare of dairy cattle

The following outcome-based criteria, specifically animal-based criteria, can be useful indicators of *animal welfare*. The use of these indicators and their appropriate thresholds should be adapted to the different situations where dairy cattle are managed. ~~Consideration should also be given to the design of the system~~. These criteria can be considered as a tool to monitor ~~the efficiency~~ impact of design and management, given that both of these can affect *animal welfare* ~~will be affected by both system design and stockmanship~~.

Consideration should also be given to the design of the system and stockmanship.

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1. Behaviour

Certain behaviours could indicate an *animal welfare* problem. These include decreased feed intake, altered locomotory behaviour and posture, altered lying time, ~~human-animal relationship,~~ altered respiratory rate and panting, coughing, shivering and huddling, grooming and the demonstration of stereotypic, agonistic, ~~aggressive~~, depressive or other abnormal behaviours (Wiepkema *et al.*, 1983; Moss, 1992; Desire *et al.*, 2002; Appleby, 2006; Mason and Latham, 2004; Lawrence, 2008; Chapinel *et al.*, 2009).

2. Morbidity rates

Morbidity rates, including for infectious and metabolic *diseases* ~~such as mastitis and metritis~~, lameness, ~~metabolic diseases, parasitic diseases~~, post-partum and post-procedural complications and injury rates, above recognised thresholds, may be direct or indirect indicators of the *animal welfare* status of the whole *herd*. Understanding the aetiology of the *disease* or syndrome is important for detecting potential *animal welfare* problems (Blecha, 2000). Mastitis, lameness, reproductive and metabolic diseases are also particularly important animal health problems for adult dairy cows. Scoring systems, such as body condition, lameness scoring and milk quality, can provide additional information (Sprecher *et al*., 1997; Roche *et al*., 2004; EFSA, 2012)

Both clinical examination and pathology should be utilised as an indicator of *disease*, injuries and other problems that may compromise *animal welfare*. *Post-mortem* examination is useful to establish causes of *death* in cattle.

3. Mortality and culling rates

Mortality and culling rates, affect the length of productive life, and like morbidity rates, may be direct or indirect indicators of the *animal welfare* status (Moss, 1992). Depending on the production system, estimates of mortality and culling rates can be obtained by analysing the rate and causes of *death* and culling and ~~the~~ their temporal ~~tempore~~ and spatial patterns of ~~mortality~~ occurrence. Mortality and culling rates should ~~can~~ be ~~reported~~ recorded regularly, i.e. daily, monthly, annually or with reference to key husbandry activities within the production cycle.

4. Changes in milk yield, body weight and body condition

In growing *animals*, body weight ~~gain (failure to achieve appropriate~~ changes outside the expected growth rate ~~curve)~~ especially excessive sudden loss ~~may be~~ are ~~an~~indicators of poor ~~animal health and~~ *animal welfare*. Future performance, including milk yield and fertility, of replacement heifers can be affected by under or over-nutrition at different stages of rearing.

In lactating *animals*, body condition ~~score~~ outside an acceptable range, significant body weight change and significant decrease in milk yield may be indicators of compromised welfare (Roche *et al.*, 2004; Roche *et al.*, 2009).

In non-lactating *animals*, including bulls, body condition ~~score~~ outside an acceptable range and significant body weight change may be indicators of compromised welfare.

5. Reproductive efficiency

Reproductive efficiency can be an indicator of animal health and *animal welfare* status. Poor reproductive performance, compared with the expected standard for that particular breed, can indicate *animal welfare* problems. Examples may include:

– anoestrus or extended post-partum interval ~~prolonged post-partum anoestrus~~,

– low conception rates,

– high abortion rates,

– high rates of dystocia,

– retained placenta,

– metritis,

– loss of fertility in breeding bulls.

6. Physical appearance

Physical appearance may be an indicator of animal health and *animal welfare*, as well as the conditions of management. Attributes of physical appearance that may indicate compromised welfare include:

– presence of ectoparasites,

– abnormal coat colour, texture or hair loss,

– excessive soiling with faeces, mud or dirt (cleanliness),

– abnormal swellings, injuries and lesions,

– discharges (e.g. from nose, eyes, reproductive tract),

– feet abnormalities,

– abnormal posture indicating pain (e.g. rounded back, head low),

– emaciation and dehydration.

7. Handling responses

Improper handling can result in fear and distress in cattle. Indicators could include:

– evidence of poor human-animal relationship, such as excessive flight distance,

– negative behaviour at milking time, such as reluctance to enter the milking parlour, kicking, vocalisation,

– ~~percentage of~~ *animals* striking restraints or gates,

– ~~percentage of~~ *animals* injured during handling, such as bruising, lacerations, broken horns and fractured legs,

– ~~percentage of~~ *animals* vocalising abnormally or excessively during restraint and handling,

– disturbed behaviour in the chute or race such as reluctance to enter ~~behaviour~~,

– ~~percentage of~~ *animals* slipping or falling.

8. Complications ~~due to~~ from ~~routine~~ common procedures ~~management~~

Surgical and non-surgical procedures may be performed in dairy cattle for ~~improving *animal* performance,~~ facilitating management, ~~and~~ improving human safety and *animal welfare*, and treatment of certain conditions e.g. disbudding, hoof trimming, displaced abomasum. However, if these procedures are not performed properly, *animal welfare* can be compromised. Indicators of such problems could include:

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– post procedure infection ~~and~~, swelling and pain behaviour,

– reduced feed and water intake

– post procedure body condition and weight loss,

– morbidity and mortality.

Article 7.X.5.

Provisions for good animal welfare

Ensuring high welfare of dairy cattle is contingent on several management factors, including system design, environmental management, and stockmanship which include~~s~~ responsible husbandry and provision of appropriate care. Serious problems can arise in any system if one or more of these elements are lacking.

Each recommendation includes a list of relevant outcome-based measurables derived from Article 7.X.4. This does not exclude other measures being used where appropriate.

1. Recommendations on system design and management including physical environment

When new facilities are planned or existing facilities are modified, professional advice on design in regards to animal health and welfare, should be sought ~~(e.g. Milk Development Council, 2006)~~.

Many aspects of the environment can impact on the health and welfare of dairy cattle. These include heat and cold, air quality, lighting, noise, etc.

a) Thermal environment

Although cattle can adapt to a wide range of thermal environments particularly if appropriate breeds are used for the anticipated conditions, sudden fluctuations in weather can cause heat or cold stress.

i) Heat stress

The risk of heat stress for cattle is influenced by environmental factors including air temperature, relative humidity, ~~and~~ wind speed, animal density (area and volume available per animal), lack of sufficient shade, ~~and~~ animal factors including breed, age, body condition, metabolic rate and stage of lactation, and coat colour and density (West, 2003; Bryant *et al.*, 2007).

Animal handlers should be aware of the risk that heat stress poses to cattle and of the thresholds in relation to heat and humidity that may require action. As conditions change, routine daily activities that require moving cattle should be amended appropriately. If the risk of heat stress reaches very high levels the *animal handlers* should institute an emergency action plan that could include provision of shade, fans, ~~easy~~ access to additional drinking water, reduction of animal density, and provision of cooling systems as appropriate for the local conditions (Igono *et al.*, 1987; Kendall *et al.*, 2007; Blackshaw and Blackshaw, 1994).

Outcome-based measurables: feed and water intake, behaviour, ~~including~~ especially respiratory rate and panting, morbidity rate, mortality rate, changes in milk yield.

ii) Cold stress

Protection from extreme weather conditions should be provided when these conditions are likely to create a serious risk to the welfare of cattle, particularly in neonates and young cattle and others that are physiologically compromised. This could be provided by extra bedding and natural or man-made shelters (Manninen *et al.*, 2002).

During extreme cold weather conditions, *animal handlers* should institute an emergency action plan to provide cattle with shelter, adequate feed and water.

Outcome-based measurables: mortality and morbidity rates, physical appearance, behaviour, ~~including~~ especially abnormal postures, shivering and huddling, growth rate ~~curve~~, body condition and weight loss.

b) Lighting

~~Confined~~ Housed cattle that do not have sufficient access to natural light should be provided with supplementary lighting which follows natural periodicity sufficient for their health and welfare, to facilitate natural behaviour patterns and to allow adequate and safe inspection of the cattle (Arab *et al.*, 1995; Dahl *et al.*, 2000; Phillips *et al.*, 2000). The lighting should not cause discomfort to the animals. Housed dairy cows should be provided with subdued night time lighting.

Outcome-based measurables: behaviour, especially altered locomotory behaviour, morbidity, physical appearance~~, mobility~~

c) Air quality

Good air quality and ventilation ~~is an~~ are important ~~factor~~ for the health and welfare of cattle by reducing the risk of respiratory discomfort and *diseases*. ~~It~~ Air quality is affected by air constituents such as gases, dust and micro-organisms, and is influenced strongly by management and building design in housed systems. ~~The air~~ Air composition is influenced by ~~the stocking~~ animal density, the size of the cattle, flooring, bedding, waste management, building design and ventilation system.

Proper ventilation is important for effective heat dissipation in cattle and to prevent~~ing~~ the build-up of effluent gases (e.g. ammonia and hydrogen sulphide), including those from manure storage systems, and dust in the ~~confinement~~ housing unit. Poor air quality and poor ventilation are risk factors for respiratory discomfort and *diseases*. The ammonia level in enclosed housing should not exceed 25 ppm.

Outcome-based measurables: morbidity rate, ~~behaviour,~~ mortality rate, behaviour, especially respiratory rate or panting, coughing, changes in weight and body condition ~~score~~ or~~,~~ growth rate ~~curve~~.

d) Noise

Cattle are adaptable to different levels and types of noise. However, exposure of cattle to sudden and unexpected noises, including from personnel, should be minimised where possible to prevent stress and fear reactions. Ventilation fans, alarms, feeding machinery or other indoor or outdoor equipment should be constructed, placed, operated and maintained in a manner that minimises ~~sudden and unexpected~~ noise.

Outcome-based measurables: behaviour especially altered locomotory behaviour, changes in milk yield.

e) Flooring, bedding, resting surfaces and outdoor areas

In all production systems cattle need a well-drained and comfortable place to rest (Baxter *et al.*, 1983; Baxter, 1992; Moberg and Mench, 2000; Bell and Huxley, 2009; O'Driscoll *et al.*, 2007). All cattle in a group should have sufficient space to lie down and rest at the same time (Kondo *et al.*, 2003; Barrientos *et al.,* 2013; Chapinal *et al*., 2013).

Particular attention should be given to the provisions for calving areas. The environment in such areas (e.g. floors, bedding, temperature, calving pen and hygiene) should be appropriate to ensure the welfare of calving cows and new born calves (Sepúlveda-Varas *et al.* accepted).

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In housed systems calving areas should be thoroughly cleaned and provided with fresh bedding between each calving. Group pens for calving should be managed based on the principle 'all in - all out'. The group calving pen should be thoroughly cleaned and provided with fresh bedding between each animal group. The time interval between first and last calving of cows kept in the same group calving pen should be minimised.

Outdoor calving pens and paddocks should be selected to provide the cow with a clean and comfortable environment. (See also 7.x.5.1 point 2 point i.)

Floor management in housed production systems can have a significant impact on cattle welfare (Ingvartsen *et al.*, 1993; Rushen and de Passillé, 1992; Barkema *et al.*, 1999; Drissler *et al.*, 2005). Areas that compromise welfare and are not suitable for resting (e.g. places with excessive ~~water and~~ faecal accumulation, wet bedding (Fregonesi *et al.*, 2007)) should not be included in the determination ~~calculation~~ of the area available for cattle to lie down.

Slopes of the pens should ~~be maintained to~~ allow water to drain away from feed troughs and not pool ~~excessively~~in the pens.

~~Facilities~~ Flooring, bedding, resting surfaces and outdoor yards should be cleaned as conditions warrant, to ensure good hygiene and minimise disease risk.

In pasture systems, stock should be rotated between paddocks to ensure good hygiene and minimise disease risk.

Some form of bedding should be provided to all animals housed on concrete. In straw, sand or other bedding systems such as rubber mats, crumbled-rubber-filled mattresses and waterbeds, the bedding should be suitable (e.g. hygienic, non-toxic) and maintained to provide cattle with a dry and comfortable place in which to lie (Fisher *et al.*, 2003; Zdanowicz *et al.*, 2004; Bell, 2007; Bell and Huxley, 2009;Fregonesi, *et al.,* 2009).

The design of a standing, or cubicle, or free stall, should be such that the *animal* can stand and lie comfortably on a solid surface (e.g. length, width and height should be appropriate for the size of the largest animal) (Tucker *et al.* 2003; Tucker *et al.*, 2004; Bell 2007; Cook *et al.*, 2008; Tucker *et al.*, 2009; Bernardi *et al.*, 2009; Anderson, 2010). There should be sufficient room for the animal to rest and to rise adopting normal postures, to move its head freely as it stands up, and to groom itself without difficulty. ~~Where possible, this design should allow for the *animal* to move its head freely as it stands up~~. Where individual spaces are provided for cows to rest, there should be at least one space per cow (Fregonesi *et al.*, 2007).

Alleys and gates should be designed and operated to allow free movement of cattle. Floors should be designed to minimise slipping and falling, promote foot health, and reduce the risk of claw injuries. ~~Slippery surfaces should be avoided (e.g. grooved concrete; metal grating, not sharp; rubber mats or deep sand) to minimise slipping and falling~~ (Rushen and de Passilé, 2006; Haufe *et al.*, 2009).

If a housing system includes areas of slatted floor, cattle, including replacement stock, should have access to a solid lying area. The slat and gap widths should be appropriate to the hoof size of the cattle to prevent injuries (Hinterhofer *et al.*, 2006; Telezhenko *et al.*, 2007).

If cattle have to be tethered whether indoors or outdoors, they should, as a minimum, be able to lie down, ~~and~~ stand up, maintain normal body posture, and turn around unimpeded. Cows kept in tie stall housing should be allowed sufficient untethered exercise to prevent welfare problems. When tethered outdoors they should be able to walk. *Animal handlers* should be aware of the higher risks of welfare problems where cattle are tethered (Loberg *et al.*, 2004; Tucker *et al.*, 2009).

Where breeding bulls are in housing systems, care should be taken to ensure that they have sight of other cattle with sufficient space for resting and exercise. If used for natural mating, the floor should not be slatted or slippery.

Outcome-based measurables: morbidity rates, especially ~~(e.g.~~ lameness~~,~~ and injury rates (e.g. hock and knee injuries and skin lesions ~~pressure sores~~), behaviour, especially altered posture, grooming and locomotory behaviour, changes in weight and body condition ~~score~~, physical appearance (e.g. hair loss, cleanliness score), growth rate ~~curve~~.

f) Location, construction and equipment

The impacts of climate and geographical factors on dairy cattle should be evaluated when farms are established. Efforts should be made to mitigate any negative impacts of those factors, including matching dairy breed to location and consideration of alternate sites.

~~Farms for dairy cattle should be situated in an appropriate geographical location for the health, welfare and productivity of the cattle.~~

All facilities for dairy cattle should be constructed, maintained and operated to minimise the risk to the welfare of the cattle (Grandin, 1980).

In pasture and combination systems tracks and races between the milking area and paddocks should be laid out and managed so as to minimise the overall distances walked. Construction and maintenance of tracks and races, including their surface, should minimise any risk to the welfare of the cattle, especially from foot health.

Equipment for milking, handling and restraining dairy cattle should only be used in a way that minimises the risk of injury, pain or distress. Manufacturers of such equipment should consider animal welfare when preparing operating instructions.

Electrified equipment designed to control animal behaviour (e.g. cow trainer, electrified gate) that has been associated with increased incidence of welfare problems should not be used.

Electric fences should be well-designed and maintained to avoid welfare problems, and used only according to manufacturer's instructions

Cattle in all ~~housed or pastured~~ production systems should be offered adequate space for comfort and socialisation (Kondo *et al.*, 2003).

Where access to an outdoor area, including pasture, is possible, there may be additional benefits to dairy cattle from the opportunity to graze and exercise, and a decreased risk of lameness.

In all production systems, feed and water provision should allow all cattle to have ~~unimpeded~~ access to feed and water (DeVries and Keyserlingk, 2005; DeVries *et al.*, 2005, DeVries *et al.*, 2004; Endres *et al.*, 2005). Feeders and water providers should be clean and free of spoiled, mouldy, sour, unpalatable feed and faecal contamination.

Milking parlour, free stalls, standings, cubicles, races, chutes and pens should be free from sharp edges and protrusions to prevent injury to cattle.

Where possible, there should be a separate~~d~~ area ~~to closely examine~~ where individual *animals~~,~~* can be examined closely and which should have restraining facilities.

~~A hospital area for~~ When relevant, sick and injured *animals* should ~~be provided so the *animals* can~~ be treated away from healthy *animals* When a dedicated space is provided this should accommodate all the needs of the animal e.g. recumbent animals may require additional bedding or alternative floors.

Hydraulic, pneumatic and manual equipment should be adjusted, as appropriate, to the size of cattle to be handled. Hydraulic and pneumatic operated restraining equipment should have pressure limiting devices to prevent injuries. Regular cleaning and maintenance of working parts is imperative to ensure the system functions properly and safe for the cattle.

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Mechanical and electrical devices used in facilities should be safe for cattle.

Dipping baths and spray races are sometimes used in dairy cattle production for ectoparasite control. Where these are used, they should be designed and operated to minimise the risk of crowding and to prevent injury and drowning.

Collecting yards (e.g. entry to the milking parlour) should be designed and operated to minimise stress ~~crowding~~ and prevent injuries and lameness.

The loading areas and ramps, including the slope of the ramp, should be designed to minimise stress and injuries for the *animals* and ensure the safety of the *animal handlers*, according to Chapters 7.2., 7.3. and 7.4.

Outcome-based measurables: handling response, morbidity rate, especially lameness, mortality rate, behaviour, especially altered locomotory behaviour, changes in weight and body condition ~~score~~, physical appearance, ~~lameness,~~ growth ~~curve~~ rate.

g) Emergency plans

Where the failure of power, water and feed supply systems could compromise *animal welfare,* dairy producers should have contingency plans to cover the failure of these systems. These plans may include the provision of fail-safe alarms to detect malfunctions, back-up generators, ~~access to maintenance providers~~ contact information for key service providers, ability to store water on farm, access to water cartage services, adequate on-farm storage of feed and alternative feed supply.

~~Dairy producers should have contingency plans to cover the evacuation of animals in case of emergency (e.g. fire, flooding).~~

~~Outcome-based measurables: mortality, morbidity, behaviour, vocalization.~~

Preventive measures for emergencies should be input-based rather than outcome based. Contingency plans should be documented and communicated to all responsible parties. Alarms and back-up systems should be checked regularly.

2. Recommendations on stockmanship and animal management

Good management and stockmanship are critical to providing an acceptable level of *animal welfare*. Personnel involved in handling and caring for dairy cattle should be competent and receive up-to-date ~~appropriate~~ training to equip them with the necessary practical skills and knowledge of dairy cattle behaviour, handling, health, biosecurity, physiological needs and welfare. There should be a sufficient number of *animal handlers* to ensure the health and welfare of the cattle.

a) Biosecurity and animal health

i) Biosecurity and disease prevention

Biosecurity means a set of measures designed to maintain a *herd* at a particular health status and to prevent the entry or spread of infectious agents.

Biosecurity plans should be designed, ~~and~~ implemented and maintained, commensurate with the best possible ~~desired~~ *herd* health status, available resources and infrastructure, and current *disease* risk and, for OIE *listed diseases* in accordance with relevant recommendations found in the *Terrestrial Code*.

These biosecurity plans should address the control of the major sources and pathways for spread of pathogens:

– cattle, including introductions to the herd,

– calves coming from different sources,

– other domestic animals, ~~and~~ *wildlife*, and pests,

– people including sanitation practices,

– equipment, tools and facilities,

– *vehicles*,

– air,

– water supply, feed and bedding,

– manure, waste and dead stock disposal

– ~~feed,~~

– semen and embryos.

Outcome-based measurables: morbidity rate, mortality rate, reproductive efficiency, changes in weight and body condition ~~score~~, changes in milk yield.

ii) Animal health management

Animal health management means a system designed to optimise the physical and behavioural health and welfare of the dairy *herd*. It includes the prevention, treatment and control of *diseases* and conditions affecting the *herd* (in particular mastitis, lameness, reproduction and metabolic diseases).

There should be an effective programme for the prevention and treatment of *diseases* and conditions, formulated in consultation with a *veterinarian*, where appropriate. This programme should include the recording of production data (e.g. number of lactating cows, births, animal movements in and out of the *herd*, milk yield), morbidities, mortalities, culling rate and medical treatments. It should be kept up to date by the *animal handler*. Regular monitoring of records aids management and quickly reveals problem areas for intervention.

At national or regional level there should be programmes to gather records and monitor diseases of importance for animal welfare.

For parasitic burdens (e.g. endoparasites, ectoparasites and protozoa), a programme should be implemented to monitor, control and treat, as appropriate.

Lameness is a problem in dairy cattle ~~herds~~. *Animal handlers* should take measures to prevent lameness, and monitor the state of feet and claws and maintain foot health (Sprecher et al., 1997; Flower and Weary, 2006; Chapinal et al., 2009)

Those responsible for the care of cattle should be aware of early specific signs of *disease* or distress (e.g. coughing, ocular discharge, changes in milk appearance, changing locomotion score), and non-specific signs such as reduced feed and water intake, reduction of milk production, changes in weight and body condition, changes in behaviour or abnormal physical appearance (FAWC, UK, 1993; Ott *et al.*, 1995; Anonymous, 1997; Blecha, 2000; EU-SCAHAW, 2001; Webster, 2004; Mellor and Stafford, 2004; Millman *et al.*, 2004; OIE, 2005; Appleby, 2006; Broom, 2006; Gehring *et al.*, 2006; Fraser, 2008; Blokhuis *et al.*, 2008; Mench, 2008; Fraser, 2009; Ortiz-Pelawz *et al.*, 2008; FAWAC, Ireland; Hart, 1987; Tizard, 2008; Weary *et al.*, 2009).

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Cattle at higher risk of *disease* or distress will require more frequent inspection by *animal handlers*. If *animal handlers* suspect the presence of a *disease* or are not able to correct the causes of *disease* or distress, they should seek advice from those having training and experience, such as *veterinarians* or other qualified advisers, as appropriate.

~~In the event of an *OIE listed disease* being suspected or diagnosed, the official veterinary services should be notified (see Chapter 1.1. of the *Terrestrial Code*).~~

Vaccinations and other treatments administered to cattle should be undertaken by people skilled in the procedures and on the basis of veterinary or other expert advice.

Animal handlers should be competent ~~have experience~~ in managing chronically ill or injured cattle, for instance in recognising and dealing with non-ambulatory cattle, especially those that have recently calved. Veterinary advice should be sought as appropriate.

Non-ambulatory cattle should have access to water at all times and be provided with feed at least once daily and milked as necessary. They should be provided shade and protected from predators. They should not be transported or moved unless absolutely necessary ~~except~~ for treatment or diagnosis. Such movements should be done carefully using methods avoiding dragging or excessive lifting.

Animal handlers should also be competent in assessing fitness to transport, as described in Chapter 7.3.

In case of chronic *disease* or injury, when treatment has failed or ~~been attempted and~~ recovery ~~deemed~~ is unlikely (e.g. cattle that are unable to stand up, unaided or refuse to eat or drink), the *animal* should be humanely killed (AABP, 2013; AVMA, 2013) and in accordance to Chapter 7.5 or Chapter 7.6 as applicable.

Animals suffering from photosensitisation should be provided with ~~offered~~ shade and where possible the cause should be identified.

Outcome-based measurables: morbidity rate, mortality rate, reproductive efficiency, depressive behaviour, altered locomotory behaviour, physical appearance and changes in weight and body condition ~~score~~, changes in milk yield.

iii) Emergency plans for disease outbreaks

Emergency plans should cover the management of the farm in the face of an emergency *disease outbreak*, consistent with national programmes and recommendations of *Veterinary Services* as appropriate.

b) Nutrition

The nutrient requirements of dairy cattle have been well defined. Energy, protein, mineral and vitamin content of the diet are major factors determining milk production and growth, feed efficiency, reproductive efficiency, and body condition (National Research Council, 2001).

Cattle should be provided with access to an appropriate quantity and quality of balanced nutrition that meets their physiological needs. Feeding systems should be designed to minimise agonistic behaviour.

Where cattle are maintained in outdoor conditions, short term exposure to climatic extremes may prevent access to nutrition that meets their daily physiological needs. In such circumstances the *animal handler* should ensure that the period of reduced nutrition is not prolonged and that extra food and water supply are provided if welfare would otherwise be compromised.

Animal handlers should have adequate knowledge of appropriate body condition ~~scores~~ scoring systems for their cattle and should not allow body condition to go outside an acceptable range according to breed and physiological status (Roche *et al.*, 2004; Roche *et al.*, 2009).

Feedstuffs and feed ingredients should be of satisfactory quality to meet nutritional needs and stored to minimise contamination and deterioration (CA 2004, CAC/RCP 54-2004). Where appropriate, feed and feed ingredients should be tested for the presence of substances that would adversely impact on animal health (Binder, 2007).

The relative risk of digestive upset in cattle increases as the proportion of grain increases in the diet or if quality of silage is poor. Therefore, when grain is given to dairy cattle it should be introduced slowly and constitute no more than 50% of the daily diet. Palatable fibrous food such as silage, grass and hay, should be available *ad libitum* to meet metabolic requirements in a way that promotes digestion and ensures normal rumen function.

Animal handlers should understand the impact of cattle size and age, weather patterns, diet composition and sudden dietary changes in respect to digestive upsets and their negative consequences (displaced abomasum, sub-acute ruminal acidosis, bloat, liver abscess, laminitis) (Enemark, 2008; Vermunt and Greenough, 1994). Where appropriate, dairy producers should consult a cattle nutritionist for advice on ration formulation and feeding programmes.

Particular attention should be paid to nutrition in the last month of pregnancy, with regards to energy balance, roughage and micronutrients, in order to minimise calving and post-calving diseases and body condition loss (Drackley, 1999; Huzzey *et al.*, 2005; Bertoni *et al.*, 2008; Goldhawk *et al,* 2009; Jawor *et al.,* 2012; Vickers *et al.,* 2013).

Feeding calves all-liquid diets limits the physiological development of the fore-stomach and the normal development of the process of rumination. Calves over two weeks old should have a sufficient daily ration of fibrous food to promote rumen development (Reece & Hotchkiss. 1987)

Dairy producers should become familiar with potential micronutrient deficiencies or excesses for ~~housed and pastured~~ production systems in their respective geographical areas and use appropriately formulated supplements where necessary.

All cattle, including unweaned calves, need an adequate supply and access to palatable water that meets their physiological requirements and is free from contaminants hazardous to cattle health (Lawrence *et al.*, 2004a; Cardot *et al.*, 2008).

Outcome-based measurables: mortality rates, morbidity rates, behaviour, especially agonistic behaviour (at the feeding area), changes in weight and body condition ~~score~~, reproductive efficiency, changes in milk yield, growth rate ~~curve~~ vocalisation.

c) Social environment

Management of cattle should take into account their social environment as it relates to *animal welfare,* particularly in housed systems (Le Neindre, 1989; Sato *et al.*, 1993; Jóhannesson and Sørensen, 2000; Bøe and Færevik, 2003; Bouissou *et al.*, 2001; Kondo *et al.*, 2003). Problem areas include: agonistic and oestrus activity, mixing of heifers and cows, feeding cattle of different size and age in the same pens, high stocking density, insufficient space at the feeder, insufficient water access and mixing of bulls.

Management of cattle in all systems should take into account the social interactions of cattle within groups. The *animal handler* should understand the dominance hierarchies that develop within different groups and focus on high risk *animals*, such as very young, very old, small or large size for cohort group, for evidence of agonistic behaviour ~~bullying~~ and excessive mounting behaviour. The *animal handler* should understand the risks of increased agonistic interactions between *animals*, particularly after mixing groups. ~~Cattle that are suffering from excessive agonistic activity should be removed from the group~~ (Bøe and Færevik, 2003; Jensen and Kyhn, 2000; von Keyserlingk *et al.*, 2008).

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When other measures have failed, cattle that are expressing excessive agonistic activity or excessive mounting behaviour should be removed from the group (Bøe and Færevik, 2003; Jensen and Kyhn, 2000; von Keyserlingk et al., 2008).

Animal handlers should be aware of the *animal welfare,* problems that may be caused by mixing of inappropriate groups of cattle, and provide adequate measures to minimise them (e.g. introduction of heifers in a new group, mixing of *animals* at different production stages that have different dietary needs) (Grandin, 1998; Grandin, 2003; Grandin, 2006; Kondo *et al.*, 2003).

Horned and non-horned cattle should not be mixed because of the risk of injury (Menke *et al.*, 1999). When farmers intend to change the phenotype of their animals, they should take appropriate measures to reduce this risk.

Outcome-based measurables: behaviour, especially ~~(e.g.~~ lying times~~,)~~, physical injuries and lesions, changes in weight and body condition ~~score~~, physical appearance (e.g. cleanliness), lameness scores, changes in milk yield, morbidity rate, mortality rate, growth rate, ~~curve~~ vocalisation.

d) ~~Stocking density~~ Space allowance

~~High stocking densities~~ Insufficient and inadequate space allowance may increase the occurrence of injuries and have an adverse effect on growth ~~curve~~ rate, feed efficiency, and behaviour such as locomotion, resting, feeding and drinking (Martin and Bateson, 1986; Kondo *et al.*, 2003).

Space allowance ~~Stocking density~~ should be managed taking into account different areas for lying, standing and feeding. ~~such that c~~ Crowding should not ~~does not~~ adversely affect normal behaviour of cattle and durations of time spent lying. (Bøe and Færevik, 2003).

~~This includes the ability to~~ All cattle should be able to rest simultaneously, and each animal ~~to~~ lie down ~~freely~~, stand up and move around freely. ~~without the risk of injuries, move freely around the pen and access feed and water.~~In growing animals space allowance ~~Stocking density~~ should also be managed such that weight gain ~~and duration of time spent lying~~ is not adversely affected ~~by crowding~~ (Petherick and Phillips, 2009). If abnormal behaviour is seen, corrective measures should be taken, such as increasing space allowance, ~~reducing stocking density~~, redefining the areas available for lying, standing and feeding.

In pastured systems, stocking density should depend on the available feed and water supply and pasture quality (Stafford and Gregory, 2008).

Outcome-based measurables: behaviour, especially depressive behaviour, morbidity rate, mortality rate, changes in weight and body condition ~~score~~, physical appearance, changes in milk yield, parasite burden, growth rate ~~curve.~~

e) Protection from predators

Cattle should be protected as much as possible from predators.

Outcome-based measurables: mortality rate, morbidity rate (injury rate), behaviour, physical appearance.

f) Genetic selection

Welfare and health considerations, in addition to productivity, should be taken into account when choosing a breed or subspecies for a particular location or production system (Lawrence *et al.*, 2001; Lawrence *et al.*, 2004b; Boissy and Le Neindre, 1997; Dillon *et al.*, 2006; Boissy *et al.*, 2007; Jensen *et al.*, 2008; Veissier *et al.*, 2008; Macdonald *et al.*, 2008). ~~Examples of these include nutritional maintenance requirement, ectoparasite resistance and heat tolerance.~~

In breeding programmes, at least as much attention should be paid to criteria conducive to the improvement of cattle welfare, including health, as to production criteria. The conservation and development of genetic lines of dairy cattle, which limit or reduce animal welfare problems, should be encouraged. Examples of such criteria include nutritional maintenance requirement, ectoparasite resistance and heat tolerance.

Individual *animals* within a breed should be selected to propagate offspring that exhibit traits beneficial to animal health and welfare by promoting robustness and longevity. These include resistance to infectious and production related *diseases*, ease of calving, fertility, body conformation and mobility, and temperament.

Outcome-based measurables: morbidity rate, mortality rate, length of productive life, behaviour, physical appearance, reproductive efficiency, lameness, human-animal relationship, growth rate ~~curve,~~ body condition ~~score~~ outside an acceptable range.

g) Artificial insemination, pregnancy diagnosis and embryo transfer

Semen collection should be carried out by a trained operator in a manner that does not cause pain or distress to the bull and any teaser animal used during collection and in accordance with Chapter 4.6.

Artificial insemination and pregnancy diagnosis should be performed by a competent operator and in accordance with the provisions of Chapter 4.7..

Embryo transfer should be performed under an epidural or other anaesthesia by a trained operator, preferably a *veterinarian* or a *veterinary para-professional* and in accordance with the provisions of Chapter 4.7.and Chapter 4.8.

Outcome-based measurables: behaviour, morbidity rate, reproductive efficiency

h) Dam and ~~S~~sire selection and calving management

Dystocia is ~~can be~~ a welfare risk to dairy cattle (Proudfoot *et al*, 2009). Heifers should not be bred before they reach ~~are at~~ the stage of physical maturity sufficient to ensure the health and welfare of both dam and calf at birth. The sire has a highly heritable effect on final calf size and as such can have a significant impact on ease of calving. Sire selection for embryo implantation, insemination or natural mating, should take into account the maturity and size of the female.

Pregnant cows and heifers should be managed during pregnancy so as to achieve an appropriate body condition range for the breed. Excessive fatness increases the risk of dystocia and metabolic disorders during late pregnancy or after parturition.

Cows and heifers should be monitored when they are close to calving. *Animals* observed to be having difficulty in calving should be assisted by a competent handler as soon as possible after they are detected.

Outcome-based measurables: morbidity rate ~~(rate of dystocia)~~, mortality rate (cow and calf), reproductive efficiency, especially rate of dystocia, retained placenta and metritis, body condition ~~score~~.

i) New born calves (see also 7.x.5 1e)

Calving aids should not be used to speed the birthing process, only to assist in cases of dystocia, and should not cause undue pain, distress, or further medical problems.

Newborn calves are susceptible to hypothermia. The temperature and ventilation of the birthing area should consider the needs of the newborn calf. Soft, dry bedding and supplemental heat can help prevent cold stress.

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Receiving adequate immunity from colostrum generally depends on the volume and quality of colostrum ingested, and how soon after birth the calf receives it.

Animal handlers should ensure that calves receive sufficient colostrum, preferably from their own dam, and within 24 hours of birth to provide passive immunity. Colostrum is most beneficial if received during the first six hours after birth. Where there is risk of disease transfer from the dam, colostrum from a healthy cow should be used. Where possible, calves should continue to receive colostrum or equivalent for at least five days after birth.

~~Where new~~ Recently born calves ~~need to be~~ should not be transported until the navel has healed, and after which time any transport required ~~this~~ should be carried out according to Chapter 7.3.

Calves should be handled and moved in a manner which minimises distress and avoids pain and injury.

Outcome-based measurables: mortality rate, morbidity rate, growth rate ~~curve~~.

j) Cow-calf separation and weaning

Different strategies to separate the calf from the cow are utilised in dairy cattle production systems. These include early separation (usually within 48 hours of birth) or a more gradual separation (leaving the calf with the cow for a longer period so it can continue to be suckled). Separation is ~~can be~~ stressful for both cow and calf (Newberry and Swanson, 2008; Weary *et al.*, 2008).

For the purposes of this chapter, weaning means the change from a milk-based diet to a fibrous diet and the weaned calf no longer receives milk in its diet. This change should be made ~~done~~ gradually and calves should be weaned only when their ruminant digestive system has developed sufficiently to enable them to maintain growth, health and good welfare (Roth *et al.*, 2009).

~~If necessary,~~ ~~d~~Dairy cattle producers should seek expert advice on the most appropriate time and method of weaning for their type of cattle and production system.

Outcome-based measurables: morbidity rate, mortality rate, behaviour after separation (vocalisations, activity of the cow and calf) , physical appearance, changes in weight and body condition ~~score~~, growth rate ~~curve~~.

k) Rearing of replacement stock

Young calves are at particular risk of thermal stress. Special attention should be paid to management of the thermal environment (e.g. provision of additional bedding, nutrition or protection to maintain warmth and appropriate growth). (Camiloti, et al. 2012)

Where possible, replacement stock should be reared in groups. Animals in groups should be of similar age and physical size (Jensen and Kyhn, 2000; Bøe and Færevik, 2003).

Whether reared individually or in group pens ~~When in pens~~, each calf should have enough space to be able to turn around, rest, stand up and groom comfortably and see and touch other animals. (see also 1.e).

Replacement stock should be monitored for cross-sucking and appropriate measures taken to prevent this occurring (e.g. provide~~sion of~~ sucking devices, revise or modify feeding practices, provide other environmental enrichments ~~use of nose guards or temporary separation~~) (Seo *et al*., 1998; Jemsem, 2003; De Paula Vieira *et al*., 2010; Ude *et al*., 2011).

Particular attention should be paid to the nutrition, including trace elements, of growing replacement stock to ensure good health and that they achieve an appropriate growth curve for the breed and farming objectives.

Outcome-based measurables: morbidity rate, mortality rate, behaviour, especially cross-sucking, altered grooming and lying behaviours, injuries, physical appearance, changes in weight and body condition ~~score~~, growth rate ~~curve, reproduction efficiency~~.

l) Milking management

Milking, whether by hand or machine, should be carried out in a calm and considerate manner in order to avoid pain and distress. Special attention should be paid to the hygiene of personnel, the udder and milking equipment (Barkema *et al.*, 1999; Breen *et al.*, 2009). All cows should be checked for abnormal milk at every milking.

Milking machines, especially automated milking systems, should be used and maintained in a manner which minimises injury to teats and udders. Manufacturers of such equipment should provide operating instructions that consider animal welfare.

A regular milking routine should be established relevant to the stage of ~~the~~ lactation and the capacity of the system. ~~(e.g.~~ For example, cows ~~female~~ in full lactation may need more frequent milking to relieve udder pressure~~,)~~. ~~All milking cows should be checked for abnormal milk at all milking times.~~

Animal handlers should regularly check the information provided by the milking system and act accordingly to protect the welfare of the cows.

~~Where a milking machine is used, it should be maintained, according to the recommendations of the manufacturer, in order to minimise teat and udder damage.~~

Special care should be paid to *animals* being milked for the first time. If possible, they should be familiarised with the milking facility prior to giving birth.

Long waiting times before and after milking can lead to health and welfare problems (e.g. lameness, reduced time to eat). Management should ensure that waiting times are minimised.

Outcome-based measurables: morbidity rate (e.g. udder health), behaviour, changes in milk yield, milk quality, physical appearance (e.g. lesions).

m) Painful husbandry procedures

Husbandry practices are routinely carried out in cattle for reasons of management, *animal welfare* and human safety. Those practices that have the potential to cause pain should be performed in such a way as to minimise any pain and stress to the *animal*.

~~Alternative procedures that reduce or avoid pain should be considered.~~

Future options for enhancing *animal welfare* in relation to these procedures include: ceasing the procedure and addressing the current need for the operation through management strategies; breeding cattle that do not require the procedure; or replacing the current procedure with a non-surgical alternative that has been shown to enhance *animal welfare*.

Example of such interventions include: dehorning, tail docking and identification.

i) Disbudding and ~~D~~ dehorning ~~(including disbudding)~~

Dairy cattle that are naturally horned are commonly dehorned in order to reduce animal injuries and hide damage, improve human safety, reduce damage to facilities and facilitate transport and handling (Laden *et al.*, 1985; Petrie *et al.*, 1996; Singh *et al.*, 2002; Sutherland *et al.*, 2002; Stafford *et al.*, 2003; Stafford and Mellor, 2005). Where practical and appropriate for the production system, the selection of polled cattle is preferable to dehorning.

Annex XXXIV (contd)

Performing disbudding at an early age where practicable, is preferred, rather than dehorning older cattle.

Thermal cautery of the horn bud by a trained operator with proper equipment is the recommended method in order to minimise post-operative pain. This should be done at an appropriate age before the horn bud has attached to the skull.

Guidance from a *veterinarian* or *veterinary paraprofessional* as to the optimum method and timing for the type of cattle and production system should be sought. The use of anaesthesia and analgesia are strongly recommended when performing disbudding, and should always be used when dehorning. Appropriate restraint systems and procedures are required when disbudding or dehorning.

Other methods of disbudding include: removal of the horn buds with a knife and the application of chemical paste to cauterise the horn buds. Where chemical paste is used, special attention should be paid to avoid chemical burns to other parts of the calf or to other calves. This method is not recommended because pain management is difficult.

Operators should be trained and competent in the procedure used, and be able to recognise the signs of pain and complications that may include excessive bleeding, sinus infection.

~~Where it is necessary to dehorn dairy cattle, producers should seek guidance from veterinary advisers as to the optimum method, use of anesthesia and analgesia, and timing for their type of cattle and production system.~~

~~Performing dehorning or disbudding at an early age, where practicable, and the use of anaesthesia or analgesia, under the supervision of a *veterinarian*, are strongly recommended.~~

~~Thermal cautery of the horn bud by a trained operator with proper equipment is the recommended method in order to minimise post-operative pain. This should be at an appropriate age before the horn bud has attached to the skull. Other methods of dehorning include: removal of the horn buds with a knife and the application of chemical paste to cauterise the horn buds. Where chemical paste is used, special attention should be paid to avoid chemical burns to other parts of the calf or to other calves.~~

Methods of dehorning when horn development has commenced involve the removal of the horn by cutting or sawing through the base of the horn close to the skull. Operators removing developed horns from dairy cattle should be trained and competent in the procedure used, and be able to recognise the signs of complications (e.g. excessive bleeding, sinus infection).

ii) Tail docking

Research shows that tail docking does not improve the health and *welfare of* dairy cattle ~~*animals*~~, therefore it is not recommended~~,~~ as a routine procedure~~, to dock the tails of dairy cattle.~~ As an alternative, trimming of tail hair should be considered where maintenance of hygiene is a problem (Sutherland and Tucker, 2011).

iii) Identification

Ear-tagging, ear-notching, tattooing, ~~freeze~~ branding and radio frequency identification devices (RFID) are ~~preferred~~ methods of permanently identifying dairy cattle ~~from an *animal welfare* standpoint~~. The least invasive approach should be adopted whichever method is chosen (e.eg minimum number of ear tags per ear, size of notch). It should be accomplished quickly, expertly and with proper equipment. ~~In some situations however hot iron branding may be required or be the only practical method of permanent identifying dairy cattle. If cattle are branded, it should be accomplished quickly, expertly and with the proper equipment. Identification systems should be established also according to Chapter 4.1.~~

Freeze branding is thought to be less painful than branding with a hot iron. Both methods should be avoided as alternative identification methods exist (e.g. electronic identification or ear-tags). When branding is used, operator should be trained and competent in procedures used and be able to recognise signs of complications.

Identification systems should be established also according to Chapter 4.1.

Outcome-based measurables: ~~postprocedural complication rate~~, morbidity rate (post-procedural complications), abnormal behaviour, vocalisations, physical appearance, ~~changes in weight and body condition score~~.

n) Inspection and handling

Dairy cattle should be inspected at intervals appropriate to the production system and the risks to the health and welfare of the cattle. ~~In most circumstances cattle~~ Lactating cows should be inspected at least once a day. Some *animals* ~~may benefit from~~ should be inspected more frequently, ~~inspection~~ for example: neonatal calves (Larson *et al.*, 1998; Townsend, 1994), cows in late gestation (Boadi and Price, 1996; Mee, 2008; Odde, 1996, Proudfoot, K., et al. 2013), newly weaned calves, cattle experiencing environmental stress and those that have undergone painful husbandry procedures or veterinary treatment.

Dairy cattle identified as sick or injured should be given appropriate treatment at the first available opportunity by competent and trained *animal handlers*. If *animal handlers* are unable to provide appropriate treatment, the services of a *veterinarian* should be sought.

Recommendations on the handling of cattle are also found in Chapter 7.5. In particular handling aids that may cause pain and distress (e.g. ~~sharp prods,~~ electric goads) should be used only in extreme circumstances and provided that the animal can move freely. Dairy cattle should not be prodded in sensitive areas including the udder, face, eyes, nose or ano-genital region. Electric prods should not be used on calves (see also point 3 of Article 7.3.8.).

Where dogs are used, as an aid for cattle herding, they should be properly trained. *Animal handlers* should be aware that presence of dogs can stress the cattle and cause fear and should keep them under control at all times. The use of dogs is not appropriate in housed systems, collection yards or other small enclosures where the cattle cannot move freely away.

Cattle are adaptable to different visual environments. However, exposure of cattle to sudden ~~or persistent~~ movement or changes in visual contrasts should be minimised where possible to prevent stress and fear reactions.

Electroimmobilisation should not be used.

Outcome-based measurables: human-animal relationship, morbidity rate, mortality rate, behaviour, especially altered locomotory behaviour, vocalisations. ~~reproductive efficiency, changes in weight and body condition score, changes in milk yield.~~

o) Personnel training

All people responsible for dairy cattle should be competent according to their responsibilities and should understand cattle husbandry, animal handling, milking routines, reproductive management techniques, behaviour, biosecurity, signs of *disease*, and indicators of poor *animal welfare* such as stress, pain and discomfort, and their alleviation.

Competence may be gained through formal training or practical experience.

Outcome-based measurables: human-animal relationship, morbidity rate, mortality rate, behaviour, reproductive efficiency, changes in weight and body condition ~~score~~, changes in milk yield.

Annex XXXIV (contd)

p) Disaster management

Plans should be in place to minimise and mitigate the effect of disasters (e.g. earthquake, flooding, fire, hurricane). Such plans may include evacuation procedures, identifying high ground, maintaining emergency food and water stores, destocking and humane killing when necessary.

~~Plans should be in place to minimise and mitigate~~There should also be plans to address the effects of ~~natural disasters or~~ extreme climatic conditions, such as ~~heat stress,~~ drought, blizzard and flooding. ~~Humane *killing* procedures for sick or injured cattle should be part of the emergency action plan~~. In times of drought, animal management decisions should be made as early as possible and these should include a consideration of reducing cattle numbers.

Humane *killing* procedures for sick or injured cattle should be part of the disaster management plan.

Reference to emergency plans can also be found in points 1 g) and 2a) iii) of Article 7.X.5.

q) Humane killing

For sick and injured cattle a prompt diagnosis should be made to determine whether the animal should be treated or humanely killed.

The decision to kill an *animal* humanely and the procedure itself should be undertaken by a competent person.

Reasons for humane killing may include:

– severe emaciation, weak cattle that are non-ambulatory or at risk of becoming downers;

– non-ambulatory cattle that will not stand up, refuse to eat or drink, have not responded to therapy;

– rapid deterioration of a medical condition for which therapies have been unsuccessful;

– severe, debilitating pain;

– compound (open) fracture;

– spinal injury;

– central nervous system *disease*;

– multiple joint *infections* with chronic weight loss; and

– premature calves that are unlikely to survive, or calves that have debilitating congenital defect.

– as part of disaster management response

For a description of acceptable methods for humane *killing* of dairy cattle see Chapter 7.6.

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痛の原因を改善できない場合には、*獣医師*その他資格あるアドバイザー等訓練を受けた経験を有する者に適宜助言を求めるものとする。

ワクチン接種その他牛に処方される治療は、当該手法に熟練した者が、獣医学的又はその他の助言に基づいて、実施するものとする。

*家畜飼養者*は、慢性病の又は受傷した乳用牛を管理する能力、たとえば、歩行困難牛、とりわけ出産したばかりの牛を識別し、対処する能力を有するものとする。獣医学的助言が適宜求められるものとする。

歩行困難牛は、常時飲水でき、少なくとも一日一回飼料が給与され、必要に応じて搾乳されるものとする。それらに対しては、日陰が施され、肉食獣から保護されるものとする。それらは、治療又は診断のため絶対的に必要な場合を除き、輸送又は移動されないものとする。その場合の移動は、引きずったり又は過度に持ち上げることを避ける方法により、慎重に行われるものとする。

*家畜飼養者*は、第 7.3 章に規定されるとおり、輸送の適合性を評価する能力も有しているものとする。

慢性的な*疾病*又は損傷の場合で、治療に失敗し、回復が見込めない時には（たとえば、自力で起立不能又は摂餌若しくは飲水を拒絶する牛）、当該*動物*は、適宜第 7.5 章又は第 7.6 章に従い人道的に殺処分されるものとする（AABP, 2013; AVMA, 2013）。

日光過敏症を患っている*動物*には、日陰が供与され、可能な場合には、その原因が同定されるものとする。

表現形質の測定指標：罹病率、死亡率、繁殖効率、抑鬱行動、異常な歩様、外観並びに体重及び体型の変化、乳量の変化

iii） 疾病発生に備えた緊急時計画

緊急時計画は、緊急の疾病発生に直面した農家における管理であって、国家プログラム及び獣医サービスの勧告と適宜整合しているものとする。

b） 栄養

乳用牛の栄養学的要求は、良く解明されている。飼料中のエネルギー、蛋白質、ミネラル及びビタミン含有量は、生乳生産及び育成、飼料利用性、繁殖性並びに外観を決める主要な要素である（National Research Council, 2001）。

牛は、その生理学的要求を満たす適切な量及び品質のバランスの取れた栄養を摂取できるようにされるものとする。給餌システムは、闘争行動を最小限に抑

えるよう設計されるものとする。

乳用牛が舎外条件に置かれている場所では、極端な気象状況への短期的な暴露により、日々の生理学的要求を満たすような栄養の摂取が妨げられるかもしれない。そのような環境では、*家畜飼養者*は、栄養減少期が長期化しないようにし、そうしなければウェルフェアが損なわれる場合には、追加の飼料及び飲水の給与が確保されるものとする。

*家畜飼養者*は、自らの牛の適切な外観評価システムに関し、十分な知識を有し、品種及び生理学的状態による、許容範囲を外れた体型とならないようにするものとする（Roche et al., 2004; Roche et al., 2009）。

飼料及び飼料原料は、栄養学的要求を満たす満足できる品質で、汚染及び悪化を最小限に抑えるよう保管されるものとする（CA 2004, CAC/RCP 54-2004）。飼料及び飼料原料は、健康に悪影響を与える物質の有無を適宜検査されるものとする（Binder, 2007）。

牛の消化不良の相対的リスクは、飼料中の穀物割合が増加する場合、又はサイレージの品質が悪い場合に増加する。したがって、乳用牛に穀物が給与される場合には、徐々に増やし、日々の給与飼料の 50 パーセントを超えない構成にするものとする。消化を促進し、通常の第一胃機能を確保する方法で代謝上の要求を満たすために、サイレージ、牧草、乾草等の嗜好性の良い繊維質飼料は、随意に摂取できるようにしておくものとする。

*家畜飼養者*は、消化不良及びその負の結果（第四胃変位、亜急性ルーメンアシドーシス、鼓張症、肝膿瘍、蹄葉炎）に関連して、牛の体格及び月齢、天候パターン、飼料組成並びに急激な飼料の変更の影響を理解しておくものとする（Enemark, 2008; Vermunt and Greenough, 1994）。酪農生産者は、飼料配合及び給餌プログラムに関する助言を牛の栄養専門家に相談するものとする。

妊娠最終齢には、分娩中及び分娩後の疾病及び削痩を最小限に抑えるため、エネルギーバランス、粗飼料及び微量栄養素に関し、栄養に特別の配慮が払われるものとする。

全流動食を仔牛に給餌することは、前胃の生理学的発育及び反芻プロセスの正常な発育を制限する。２週齢を超える仔牛には、第一胃の発育を促進するため、１日当たり給与量の繊維食が与えられるものとする（Reece & Hotchkiss, 1987）。

酪農生産者は、各自の立地する地域の生産システムにおける微量栄養素の潜在的な欠乏又は過剰に精通し、必要に応じて加工補助飼料を適宜使用するものとする。

すべての牛は、離乳前の仔牛を含めて、その生理学的要求を満たした牛の健康

に危害を与えるものに汚染されていない嗜好に合った水が十分に供給され、飲水できる必要がある（Lawrence *et al.*, 2004a; Cardot *et al.*, 2008）。

表現形質の測定指標：罹病率、死亡率、行動、とりわけ闘争行動（給餌区域）、体重及び体型の変化、乳量の変化、発育速度、鳴き声

c） 群内環境

牛の管理では、とりわけ舎飼型においては、それがアニマルウェルフェアに関連することから、その群内環境が考慮されるものとする（Le Neindre, 1989; Sato *et al.*, 1993; Johannesson and Sorensen, 2000; Boe and Faerevik, 2003; Bouissou *et al.*, 2001; Kondo *et al.*, 2003）。問題の多い区域には、闘争及び発情行為、未経産牛と経産牛の混合、さまざまな体格及び月齢の牛の同一房内での給餌、過密飼育、採食場の不足、給水不足並びに種雄牛の混合などが見られる。

牛の管理では、すべての飼養体系において、牛群内の牛の社会的相互関係が配慮されるものとする。*家畜飼養者*は、闘争行動及び過剰なマウンティング行動を基に、さまざまな牛群内で形成される優越順位を理解し、幼齢、高齢、コホートグループを形成するには頭数が少ない又は多い等の高リスク動物に傾注するものとする。*家畜飼養者*は、とりわけ複数の牛群を混合した後に、動物間の闘争的相互関係が増加するリスクがあることを理解するものとする。

過剰な闘争行為又は過剰なマウンティング行動を発現している牛は、他の措置が失敗した場合には、当該グループから移動させるものとする（Boe and Faerevik, 2003; Jensen and kyhn, 2000; von Keyserlingk *et al.*, 2008）。

*家畜飼養者*は、不適切な牛群の混合（たとえば、新しい牛群への未経産牛の導入、異なる栄養要求にある異なる育成ステージの*動物*の混合）によって生じるおそれのある*アニマルウェルフェア*上の問題を認識し、それを最小限に抑えるための適切な措置をとるものとする（Grandin, 1998; Grandin, 2003; Grandin, 2006; Kondo *et al.*, 2003）。

有角及び無角の牛は、損傷のリスクがあるため、混合しないものとする（Manke et al., 1999）。農家は、自らの動物の表形の変更を予定する場合には、これに伴うリスクを低減する適切な措置をとるものとする。

表現形質の測定指標：行動、とりわけ横臥時間、身体損傷及び病変、体重及び体型の変化、外観（たとえば、清潔性）、跛行評点、乳生産量の変化、罹病率、死亡率、寄生虫負荷量、発育速度、鳴き声

d） 空間的ゆとり

空間的ゆとりが不十分及び不適切な場合には、損傷の発生が増加する場合があ

り、発育速度、飼料効率及び歩行運動、休息、摂食、飲水等の行動に悪影響を与えることがある（Martin and Bateson, 1986; Kondo *et al*,. 2003）。

空間的ゆとりは、横臥、立位及び摂餌のためのさまざまな空間を考慮して管理されるものとする。密飼いが、牛の通常の行動及び横臥して過ごす時間に悪影響を与えないものとする（Boe and Faerevik,2003）。

すべての牛が同時に休息することができ、各動物が、自由に横臥し、起立し、自由に動き回れるものとする。育成中の動物の場合には、空間的ゆとりは、増体が悪影響を受けることがないように管理されるものとする（Petherick and Phillips, 2009）。異常行動が見られる場合には、空間的ゆとりの増加、横臥、起立及び摂餌に利用できる空間の変更等の是正措置がとられるものとする。

飼育密度は、放牧型では、利用可能な飼料及び給水並びに牧草の質に依存して決まる（Stafford and Gregory, 2008）。

表現形質の測定指標：行動、とりわけ沈鬱行動、罹病率、死亡率、体重及び体型の変化、外観、乳生産量の変化、寄生虫負荷量、発育速度

e） 捕食動物からの保護

牛は、可能な限り捕食動物から保護されるものとする。

表現形質の測定指標：死亡率、罹病率（損傷率）、行動、外観

f） 遺伝学的選択

特定の場所又は生産方式に合った品種又は亜種を選択する場合には、生産性のほかに、ウェルフェア及び健康が考慮されるものとする（Lawrence *et al*., 2001; Lawrence *et al*., 2004b; Boissy and Le Neindre, 1997; Dillon *et al*., 2006; Boissy *et al*., 2007; Jensen *et al*., 2008; Veissier *et al*., 2008; Macdonald *et al*., 2008）。

育種プログラムにおいては、牛の健康を含むウェルフェアの向上に資する基準に対し、生産基準と少なくとも同等以上の注意が払われるものとする。アニマルウェルフェア上の問題を限定又は緩和する乳用牛の遺伝的系統は、保護又は発展させることが奨励されるものとする。その基準の例には、栄養管理要求、外部寄生虫耐性、耐暑性等がある。

同一品種内の個々の*動物*は、健全性と長命性を増進することによって、動物の健康及びアニマルウェルフェアにとって有益な特性を発現する子孫を増やすように選択されるものとする。それには、感染及び生産関連疾病に対する耐性、分娩の容易さ、繁殖力、体格及び運動性並びに気性などがある。

表現形質の測定指標：罹病率、死亡率、繁殖月齢の期間、行動、外観、繁殖効

率、跛行、人・動物関係、発育速度、許容範囲を超えた外観

g） 人工授精、妊娠診断及び受精卵移植

精液の採取は、訓練を受けた技師によって、種雄牛及び採取中に使用される台雌に痛み又は苦痛を与えない方法で、第 4.6 章に従い実施されるものとする。

人工授精及び妊娠診断は、資格の有る技師によって、第 4.7 章の規定に従い実施されるものとする。

受精卵移植は、硬膜外麻酔又はその他の麻酔下で、訓練を受けた技術者、なるべくであれば*獣医師*又は*畜産技術士*によって、第 4.7 章及び第 4.8 章の規定に従い実施されるものとする。

表現形質の測定指標：行動、罹病率、繁殖効率

h） 母牛及び種雄牛の選択並びに分娩管理

難産は､乳用牛にとってウェルフェア上のリスクである(Proudfoot *et al*., 2009)。未経産牛は、母牛及びヌレ仔の両方の健康及びウェルフェアを確保するのに十分な性成熟段階に達する前に、繁殖に供されることがないものとする。種雄牛の品種は、仔牛の最終的な体格に大きな遺伝性の影響を有し、その事が分娩の容易さに大きな影響をもたらすことがある。受精卵移植、精液注入又は自然交配のための種雄牛の選択に当たっては、雌牛の性成熟の程度及び体格を考慮するものとする。

妊娠中の経産牛及び未経産牛は、身体状態が当該品種にとって適切な範囲内となるよう妊娠中管理されるものとする。過度の肥満は、難産及び、妊娠後期又は分娩後の代謝異常のリスクを高める。

経産牛及び未経産牛は、分娩が近づいた時には観察されるものとする。分娩に際し問題が起きていることが観察された動物は､発見後可能な限りすみやかに､有能な飼養者によって介助されるものとする。

表現形質の測定指標：罹病率、死亡率（雌牛及び仔牛)、繁殖効率、とりわけ難産率、後産停滞及び子宮炎、体型

i） ヌレ仔（第 7.X.1 条第 1 項第 e 号参照）

分娩介助は、出産プロセスを早めるためではなく、もっぱら難産時の手助けとして行われ、過度の痛み、苦痛又は一層の獣医学的問題を起こすことがないようにするものとする。

ヌレ仔は、低体温症になりやすい。分娩区域の温度及び換気は、ヌレ仔の要求

を考慮したものとする。やわらかくて乾燥した敷料及び補助的な加熱が、低温ストレスの予防に役立つ場合がある。

初乳から十分な免疫を受けるか否かは、摂取した初乳の量及び質並びに当該仔牛が誕生後どれだけ速やかに初乳を飲んだかによって一般的に決まってくる。

*家畜飼養者*は、受動免疫を与えるため、仔牛が、なるべくならその実の母牛から、誕生後 24 時間以内に十分な初乳を摂取することを確保するものとする。初乳は、誕生後最初の 6 時間以内に摂取された場合に最も有益である。母牛からの疾病伝播のリスクがある場合には、健康な雌牛の初乳が使われるものとする。仔牛は、可能な場合には、誕生後少なくとも 5 日間は、初乳又はそれ相当のものを継続的に与えられるものとする。

ヌレ仔は、臍が癒合するまで輸送されないものとし、その後輸送が必要になった場合には、第 7.3 章に従い輸送されるものとする。

仔牛は、苦痛を最小限に抑え、痛み及び損傷を予防する方法で取り扱われ及び移動されるものとする。

表現形質の測定指標：死亡率、罹病率、発育速度

j） 母仔分離及び離乳

仔牛を母牛から引き離すためのさまざまな手法が、乳用牛生産方式で活用されている。これには、早期分離（通常出生後 48 時間以内）又はより緩徐な分離（継続的に乳を飲むことができるようにより長期間母牛と一緒に仔牛を置く）がある。分離は、母牛及び仔牛の双方に多くのストレスを与える（Newberry and Swanson, 2008; Weary *et al.*, 2008）。

本章においては、離乳とは、哺乳を基本とする飼料給与から粗飼料への給与の変更をいい、離乳仔牛は、以後その飼料として乳を摂取することはない。この変更は、段階的になされるものであり、その反芻消化器系が、成長、健康及び良好なウェルフェアを維持することができるよう反芻消化器系が十分に発達してはじめて、仔牛は離乳されるものとする（Roth *et al.*, 2009）。

酪農生産者は、その牛の品種及び生産体系にとって最もふさわしい離乳の時期及び方法に関し、専門的な助言を求めるものとする。

表現形質の測定指標：罹病率、死亡率、分離後の行動（母仔牛の鳴き声、動き）、外観、体重及び体型の変化、発育速度

k） 後継牛の育成

若齢牛は、とりわけ温度ストレスのリスクにさらされている。特別な配慮が、

温度環境の管理（たとえば、暖かさ及び適切な育成を維持するための追加敷料、栄養又は保護の提供）に払われるものとする（Camiloti, *et al*., 2012）。

後継牛は、可能な場合には、牛群で育成されるものとする。牛群内は、同じ月齢及び体格であるものとする（Jensen and Kyhn, 2000; Boe and Faerevik, 2003）。

個別に又は群飼房で育成されるかにかかわらず、各仔牛は、快適に転回し、休息し、起立し、毛繕いを行い、他の牛を見て触れることができる十分な空間を有するものとする（第 1 項第 e 号参照）。

後継牛は、相互に乳首を吸い合う行動が観察され、その発生を防止するための適切な措置（たとえば、おしゃぶり装置の提供、給餌慣行の見直し又は変更、その他改善された環境の提供）がとられるものとする（Seo *et al*., 1998; Jemsem, 2003; De Paula Vieira *et al*., 2010; Ude *et al*., 2011）。

健康並びにその品種及び営農目的に合った適切な成長曲線を達するため、育成中の後継牛に係る微量元素を含む栄養について、特別な配慮が払われるものとする。

表現形質の測定指標：罹病率、死亡率、行動、とりわけ相互に乳首を吸い合う行動、異常な毛繕い及び横臥行動、損傷、外観、体重及び体型の変化、発育速度

l） 搾乳管理

搾乳は、人手によるか機械によるかにかかわらず、痛み及び苦痛を避けるため、静かで思いやりのある方法で行われるものとする。飼養者、乳房及び搾乳器具の衛生に対し、特別な配慮が払われるものとする（Barkema *et al*., 1999; Breen *et al*., 2009）。すべての搾乳牛は、搾乳の都度、異常乳の有無が確認されるものとする。

搾乳機、とりわけ自動搾乳システムは、乳頭及び乳房の損傷を最小限に抑える方法で使用又は整備されるものとする。そのような機械の製造業者は、アニマルウェルフェアを考慮した取扱説明書を提供するものとする。

通常の搾乳手順は、泌乳ステージ及び当該システムの能力に応じて制定されるものとする。たとえば、泌乳ピーク時の雌牛は、乳房圧を緩和するため、より頻繁に搾乳する必要があるかもしれない。

*家畜飼養者*は、搾乳システムから得られるデータを定期的に確認し、搾乳牛のウェルフェアを保護するため、状況に応じて行動するものとする。

初めて搾乳される搾乳牛に対しては、特別な注意が払われるものとする。可能な場合には、出産に先立ち、搾乳施設に馴致させておくものとする。

搾乳前後の長い待機時間が、健康及びウェルフェア上の問題（たとえば、跛行、摂食時間の減少）につながる場合がある。待機時間を最小限に抑えるように管理されるものとする。

表現形質の測定指標：罹病率（たとえば、乳房衛生）、行動、乳生産量の変化、乳質、外観（たとえば、病変）

ⅲ） 痛みを伴う飼養管理

管理、*アニマルウェルフェア*及び人の安全を理由に、管理業務が、牛に対し、日常的に行われている。痛みを伴うおそれのある管理業務は、当該牛に対する痛み及びストレスを最低限に抑える方法で実施されるものとする。

当該行為に関連して、*アニマルウェルフェア*を強化するための今後の選択肢としては、当該行為の中止及び当該業務の現在の必要性に対する管理手法を通じた対処、当該行為を必要としない牛の育種及び*アニマルウェルフェア*を強化することが示されている非外科的な代替方法への現行手法の変更などがある。

そのような介在の例としては、除角、断尾及び個体識別がある。

i） 摘芽及び除角

自然に角が生えた乳用牛は、乳用牛の損傷及び皮の傷を減らし、人の安全性を向上させ、施設への損害を少なくし、輸送及び取扱を円滑化する目的で、通常、除角されている（Laden *et al*., 1985; Petrie *et al*.,1996; Singh *et al*., 2002; Sutherland *et al*., 2002; Stafford *et al*., 2003; Stafford and Mellor, 2005）。当該生産方式にとってそれが実用的で適切な場合には、無角牛の選択が、除角よりも望ましい。

若齢段階で除角を実施することは、実行可能な場合には、高齢牛を除角するよりも好まれる。

訓練を受けた技術者による適切な施設での角芽の焼烙は、手技後の痛みを最小限に抑える目的において、推奨される方法である。これは、角芽が頭蓋骨に付着する前の適切な月齢で実施されるものとする。

牛のタイプ及び生産方式にとって最適な方法及び時期に関し、*獣医師*又は*畜産技術士*の指導が求められるものとする。麻酔及び無痛法の使用は、摘芽を実施する場合には、強く推奨されており、除角する場合には、常に使用されるものとする。適切な保定のためのシステム及び行為が、摘芽又は除角する場合には求められる。

除角のためのその他の方法には、刃物による角芽の除去及び角芽を焼烙する化学軟膏の塗布がある。化学軟膏を使用する場合には、当該仔牛の他の

部位及び他の仔牛に対し、化学熱傷を与えるのを避けるため特別な注意が払われるものとする。この方法は、痛みの管理が困難なことから推奨されない。

技術者は、使用される方法に関し、訓練を受け、有能であって、痛み及び、過剰な出血、膿瘍感染等の合併症の徴候を認識することができるものとする。

角の発育が始まった場合の除角の方法には、頭蓋近くの角の基部を切断又はのこぎり引きすることによる角の除去がある。発育した角を乳牛から除去する技術者は、使用される方法に関し、訓練を受け、有能であって、合併症（たとえば、過剰出血、膿瘍感染）の徴候を認識することができるものとする。

ii） 断尾

研究では、断尾によって、乳牛の健康及びウェルフェアが向上することがないことが示されており、したがって、日常的な行為としては推奨されない。健康の維持が問題である場合には、尾毛の刈り取りが、代替法として考慮されるものとする（Sutherland and Tucker, 2011）。

iii） 個体識別

耳標装着、耳刻、刺青、凍結烙印及び無線周波数識別装置（RFID）が、乳牛を永続的に個体識別する方法である。どの方法が選ばれたとしても、観血が最も少ない方法（最少限の一耳当たり耳標数、耳刻のサイズ）が採用されるものとする。それは、すみやかに、専門的に、適切な器具を用いて実施されるものとする。

凍結烙印は、焼きごてによる烙印よりも痛みが少ないと考えられる。どちらの方法も、代替の個体識別法（たとえば、電子的個体識別又は耳標）が存在することから、避けるものとする。技術者は、烙印が使われる場合には、使用される方法に関し、訓練を受け、有能であって、合併症の徴候を認識することができるものとする。

個体識別制度は、第 4.1 条にも従い確立されるものとする。

表現形質の測定指標：罹病率（手技後の合併症）、異常行動、鳴き声、外観

n） 検査及び取扱

乳用牛は、当該生産方式並びに当該牛の健康及びウェルフェアに対するリスクに応じた間隔で、検査されるものとする。搾乳牛は、少なくとも一日一回検査されるものとする。動物によっては、より頻繁に検査を受けるものとする。た

とえば、ヌレ仔（Larson *et al*., 1998; Townsend, 1994）、**妊娠後期の雌牛**（Boadi and Price, 1996; Mee, 2008; Odde, 1996, Proudfoot, K., *et al*.,2013）、**離乳したての仔牛、環境ストレスを受けている牛、痛みを伴う飼養管理又は獣医学的処置を受けているものがこれに該当する。**

病気にかかった又は損傷を受けていることが確認された乳用牛は、できるだけ早い機会に、有能で、訓練を受けた*家畜飼養者*による適切な治療を受けるものとする。*家畜飼養者*が適切な治療ができない場合には、*獣医師*による処置が求められるものとする。

牛の取扱に係る推奨事項は、第 7.5 章にも見られる。とりわけ痛み及び苦痛を与えるおそれのある取扱補助器具（たとえば、電気突き棒）は、極端な場合であって、当該動物が自由に移動できるときにのみ使用されるものとする。乳牛は、乳房、顔、目、鼻、肛門性器部等の敏感な部位を突っつかれることがないものとする。電気突き棒は、仔牛には使用されないものとする（第 7.3.8 条第 3 項参照）。

牧畜の補助として犬が使用される場合には、適切に訓練を受けるものとする。*家畜飼養者*は、犬の存在が牛にストレスを与え、恐怖をもたらす場合があることを認識し、それを常時管理下に置くものとする。犬の使用は、舎飼型、集舎囲いその他の牛が自由に逃れることができない小囲いの中では適切ではない。

牛は、さまざまな視覚環境に順応できる。ただし、ストレス及び恐怖に対する反応を防止するため、突然の移動又は視覚的対照の変化に牛を曝すことは、可能な場合には、最低限に抑えるものとする。

電気拘束は用いないものとする。

表現形質の測定指標：人・動物相互関係、罹病率、死亡率、行動、とりわけ異常な運動行動、鳴き声

o） 職業訓練

乳用牛に対し責任のあるすべての者は、その責任に応じた能力を有し、飼養、牛の取扱、搾乳作業、繁殖管理技術、行動、家畜防疫、疾病の徴候並びに、ストレス、痛み、不快等の不十分な*アニマルウェルフェア*の指標及びその緩和に関し、理解しているものとする。

正式な訓練又は実務経験を通じて能力が取得される場合もある。

表現形質の測定指標：人・動物相互関係、罹病率、死亡率、行動、繁殖効率、体重及び体型形質の変化、乳生産量の変化

p） 災害管理

災害（たとえば、地震、洪水、火事、台風）の影響を最小限に抑え、緩和するための計画が施行されているものとする。そのような計画には、避難手順、高台の確認、緊急備蓄飼料及び水の供給、必要に応じた間引き及び人道的殺処分が含まれる場合がある。

旱ばつ、吹雪、洪水等の異常気象条件の影響に対処するための計画もある。旱ばつの場合には、動物管理の決定が可能な限り早期に行われるものとし、それには牛の頭数削減に関する検討が含まれるものとする。

病気又は受傷牛の人道的殺処分手順は、当該災害管理計画の一部とされるものとする。

緊急時計画の参照は、第 7.X.5 条第 1-g 号及び第 1-g 号に見ることができる。

q） 人道的殺処分

疾病の又は損傷した牛に対しては、当該動物を治療するか又は殺処分するかを決定するため、すみやかな診断が行われるものとする。

動物の人道的殺処分の決定及びその手順自体は、能力のある者が請け負うものとする。

人道的殺処分の理由には、以下のものがある場合がある。

— 重度な削痩、歩行不能又はダウナー牛になるおそれのある虚弱な牛

— 立ち上がろうとせず、摂食又は飲水を拒絶し、治療に反応しない歩行不能牛

— 治療の甲斐ない容態の急速な悪化

— 衰弱を引き起こす深刻な痛み

— 複雑（開放）骨折

— 脊髄損傷

— 中枢神経系の*疾病*

— 慢性的な体重の減少を伴う多関節*感染症*

— 生き延びる可能性のない未熟仔牛又は衰弱を引き起こす先天性障害を持つ仔牛

— 災害管理対応の一部として

乳用牛の人道的*殺処分*の受け入れ可能な方法の記述に関しては、第 7.6 章を参照されたい。